

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
16 December 2004 (16.12.2004)

PCT

(10) International Publication Number
WO 2004/109057 A3

(51) International Patent Classification⁷:
C09K 5/06, F16L 59/14, E21B 17/01

E21B 43/01,

(74) Agent: MURGITROYD & COMPANY; 165-169 Scotland Street, Glasgow G5 9PL (GB).

(21) International Application Number:

PCT/GB2004/002349

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(22) International Filing Date: 3 June 2004 (03.06.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

0312781.8

4 June 2003 (04.06.2003) GB

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(71) Applicant (for all designated States except US): YTHAN ENVIRONMENTAL SERVICES LIMITED [GB/GB]; Unit 1, Castle Street, Castlepark Industrial Estate, Ellon, Aberdeenshire AB41 9RF (GB).

(72) Inventor; and

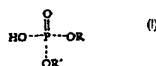
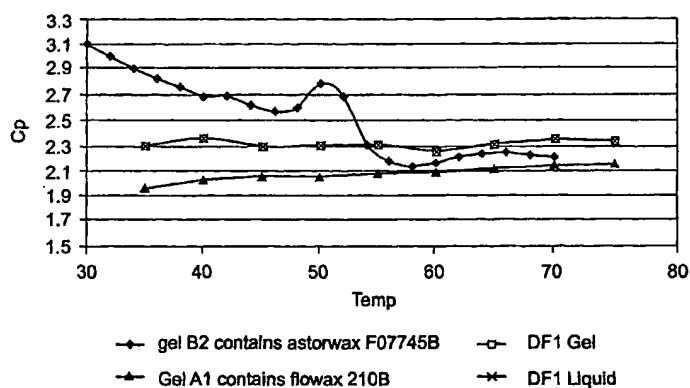
(75) Inventor/Applicant (for US only): COLLINS, Patrick, Joseph [GB/GB]; 38 Eilean Rise, Ellon, Aberdeenshire AB41 9NF (GB).

Published:

— with international search report

[Continued on next page]

(54) Title: METHOD OF THERMALLY INSULATING PIPES



(57) Abstract: A method of insulating pipeline bundles used in recovering hydrocarbons from wells is disclosed. A (5) polymeric substance, such as an orthophosphate ester (6) according to formula (1), is injected into the annulus (7) between a carrier pipe and the hydrocarbon conveying 8 tubular. A ferric salt, such as ferric sulphate, (9) is added as a gelling agent. An alternative embodiment uses (4)-(4-ormylphenylethenyl)-(1)-ethylpyridinium methosulphonate (SbQ) cross linked with polyvinyl alcohol in acidic conditions to form a gel. The mixture results in a gel having a dynamic viscosity of greater than (1000) PaS. The gel insulates the inner hydrocarbon-conveying tubulars from the surrounding seawater thus helping to maintain the relatively high temperature therewithin. This in turn reduces the likelihood for chemicals, such as hydrates, to be precipitated out of the oil phase.



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(88) Date of publication of the international search report:
7 April 2005